

# NEC

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Installation and operating instructions for the color interface AI-80Z

### Table of contents:

1. INTRODUCTION
2. PARTS INVENTORY
3. NECESSARY HARDWARE
  3. 1.: In the computer
  3. 2.: Which monitor is necessary?
  3. 3.: Pin configuration of connection cable C (monitor connector)
4. INSTALLATION INSTRUCTIONS
  4. 1.: IIe
  4. 2.: All other APPLE models
  4. 3.: Trouble shooting
5. OPERATING INSTRUCTIONS
  5. 1.: Hardwareswitches
  5. 2.: Softwareswitches
  5. 3.: Color selection
6. COLOR DEMONSTRATION PROGRAM
7. WARRANTY AND COPYRIGHT

### 1. INTRODUCTION

The RGB card AI-80Z will display the 15 LORES colors including brown plus one additional LORES color (darkgrey) and the 6 HIRES colors absolutely clear and stable as described in the handbooks of the APPLE computer. Text will be shown without any shading or ghost images.

Any of 13 LORES colors can be selected as the background and at the same time any of 13 LORES colors can be choosen for the character display. Text colors vary slightly from the graphic colors. The combination of the colors is at the users choice (max. 156 usable combinations), for example black on white, blue on yellow, pink on ...

Text of your 80col card will be shown in color too. Switching between 40 and 80column screens will be done automatically, when the 80col card is installed in slot 3 by means of an integrated softswitch.

HIRES colors may be switched off. Drawing will then be possible with one of the 13 LORES colors as in the text mode.

POKE commands are used for selecting colors (POKE 49392, xx).

## 2. PARTS INVENTORY

- The following parts are included
1. this instruction manual
  2. the color interface card AI-80Z
  3. the cable set CAI91 (3 cables)  
cable A= cable with IC socket  
cable B= cable with 2pole connector  
cable C= monitor connection cable

## 3. NECESSARY HARDWARE

### 3.1. In the computer

No additional hardware is required to operate the RGB card except a color monitor which will be described later. In order to utilize the RGB cards ability to show text and graphics in the 80col mode the following equipment must be available: on the APPLE IIe an original 80col card (monochrome) with or without memory expansion and on all other APPLES a VIDEY 80col card.

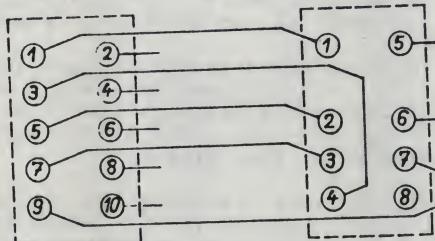
### 3.2. Color monitor requirements

Any RGB color monitor can be used in connection with the AI-80Z. If the full ability of the card is desired it is necessary to use an 4bit RGB TTL monitor. However we recommend for the best results either of the following NEC monitors be used

- a) NEC JC-1203 DH, 12", 16 colors, high resolution
- b) NEC JC-1402 DH, 14", 8 colors, high resolution \*  
(16 colors with additional card)
- c) NEC JC-1420 DE, 14", 8 colors, medium resolution
- d) NEC CU- 901 DH, 9", 8 colors, high resolution, chassis type  
(16 colors with additional card)

\* on the monitor JC-1402 DH hsync and vsync (pin 7 and 8 on the monitor connector must be connected.

### 3.3. Pin configuration of connection cable C (monitor connector)



INTERFACE KABEL(cable) C

- 1- INT
- 3- B
- 5- R
- 7- G
- 9-HSync
- 10- +5V
- 2,4,6,8- Gnd

MONITOR

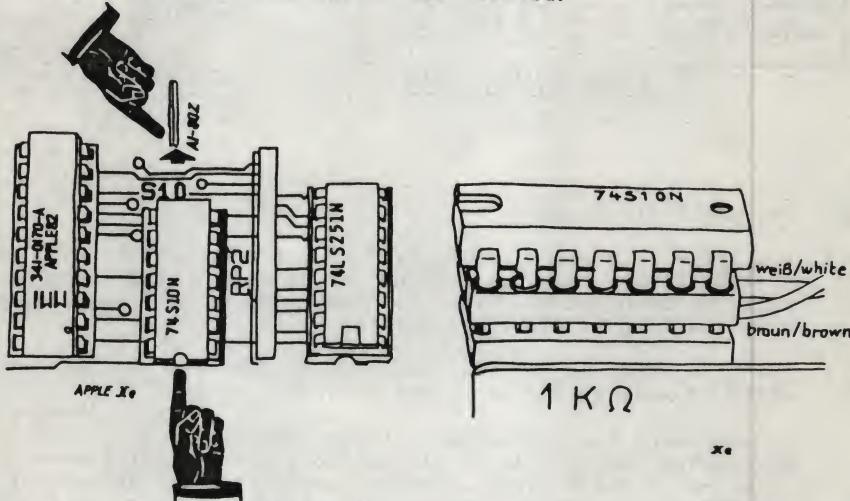
- 1- INT
- 2- R
- 3- G
- 4- B
- 5,6- Gnd
- 7- HSync
- 8- VSync

#### 4. INSTALLATION INSTRUCTIONS

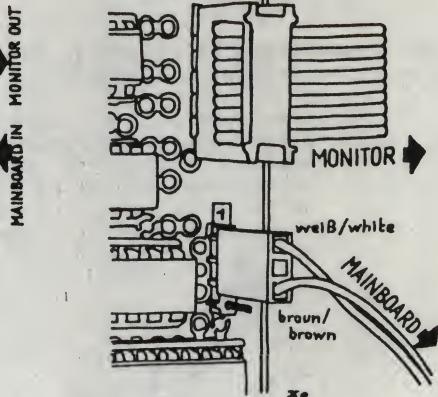
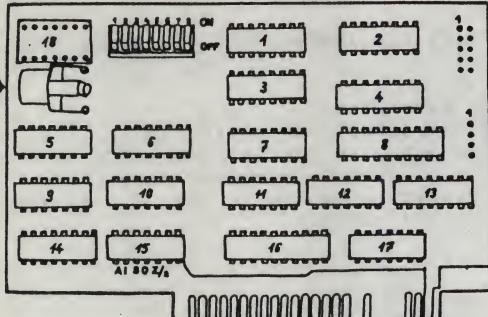
##### 4.1. IIe

The installation of the color interfacecard AI-80Z into the APPLE IIe is done in the following manner:

1. Make sure your computer is turned off.
2. First remove the cover of the APPLE and locate the IC 74S10 at position CD12. If you do not know how to locate ICs on the motherboard please refer to the APPLE reference manual section of the APPLE motherboard layout. Now remove the IC. Remember from which direction the IC was removed.



3. Insert into the vacant socket the adaptor of the connection cable A in such a way, so that the cables which are attached to the adaptor face the rear of the motherboard (refer to the illustration).
4. Now reinser the IC 74S10 into the adaptor socket. Make sure that you insert it in the same direction as it was before.
5. Now connect the other end of the cable A with the RGB card. Please note that the white cable should be towards the top of the card and insert it into pin no. 1 as numbered on the card. Please note that there are two connection points on the RGB card one of which has two rows and one one row. The top connector has two rows. The cable should be inserted into the one row connector.
6. Located on the very rear of the APPLE are plastic covers of which cover no. 2 must be removed. These covers are clearly numbered on the outside of the computer.
7. Next cable C should be connected to the interface card by inserting the cable through the opening 2 at the rear of the APPLE and into the two row connector of the RGB card so that the cable leads away from the card as indicated in the illustration.
8. The RGB card can now be inserted into the peripheral slot 7 of the IIe which is the rightmost slot in the APPLE.
9. Now replace the cover onto the computer and connect the connection cable C into the monitor connector.
10. Now the monitor and the computer can be turned on. It should operate in the normal fashion with white letters on a black background. If not, turn off the monitor and the computer and go through the installation procedures again. If the monitor is still not functioning correctly please refer to section 4.3. of this instruction manual.

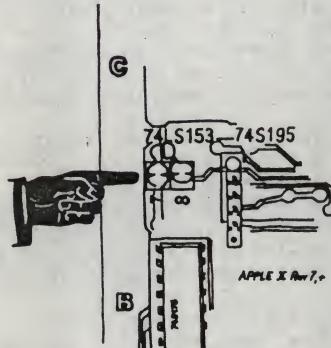


#### 4.2. Pre APPLE IIe models

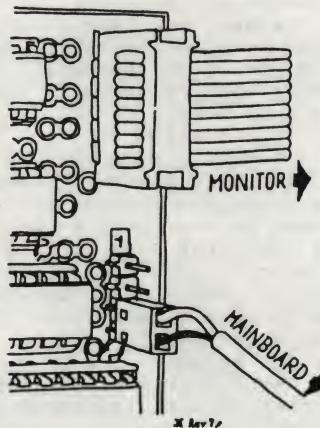
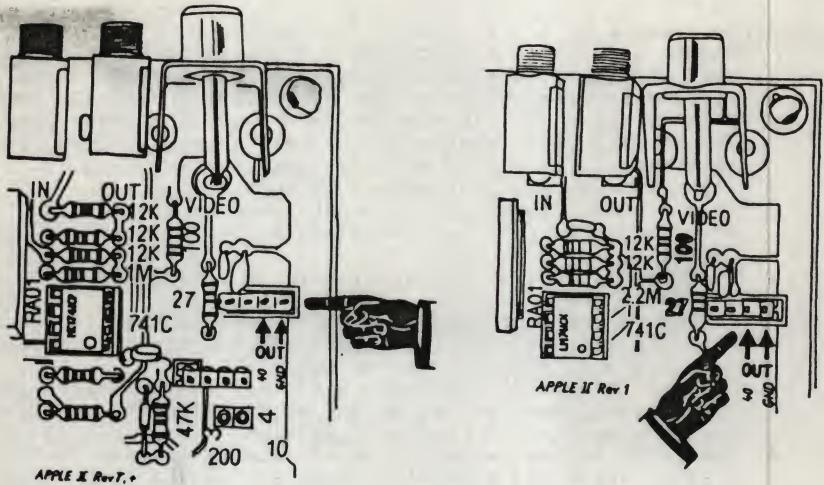
4.2.1. FOR APPLE II OWNERS: IF YOU WANT TO USE THE FULL GRAPHICS CAPABILITIES OF YOUR COMPUTER IT MIGHT BE NECESSARY (DEPENDING ON WHICH TYPE OF APPLE II YOU HAVE) TO CHANGE THE IC NO. 4 (INTERFACE). PLEASE ASK YOUR DEALER FOR DETAILS.

4.2.2. The installation of the color interface card AI-802 into the APPLE II models is done in the following manner:

1. Make sure your computer is turned off.
2. Located on the APPLE II are two solder points that are numbered 7 and 8 respectively on position BC1. In order for the card to operate correctly both solder points 7 and 8 must be closed. If the solder points are not closed correctly you will see two half moons at position 7 and 8. If they are closed correctly you will see only one solder point at 7 and 8. If the solder points are not closed they will have to be closed by inserting solder between the two half moons of both solder points 7 and 8 (see drawing).



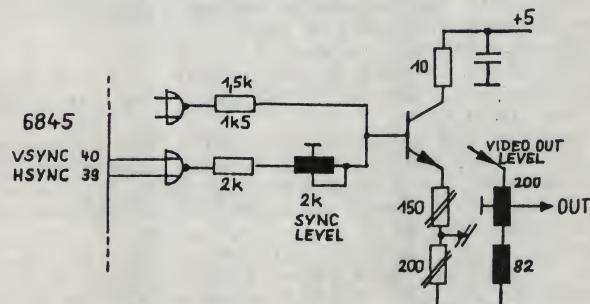
3. Connect the two pin connector of connection cable B onto the four pin connector on the motherboard so that the ground faces right (see drawing).
4. Connect the other end of the cable onto the four pin connector on the interface card so that the ground is on pin 4 and the hot line is on pin 3. This should be connected so that only the bottom two pins (3 and 4) should be used.



5. Now connect the one end of the monitor connection cable C to the 10 pin/2 row connector on the interface card so that the cable faces away from the card.
6. Now insert the card in slot 7.
7. If a VIDEX 80col card is being used, please insert the 80col-connection cable of the VIDEX card onto the cinch connector of the interface card.
8. Now replace the cover of the APPLE and connect the other end of the monitor cable to the monitor connector.
9. Both computer and the monitor may now be turned on.
10. The APPLE should work as usual except the monitor will show a black background with white text. If not, turn both the computer and the monitor off and go through the installation steps again to make sure that all directions have been followed correctly. If the computer and the monitor are still not functioning correctly refer to section 4.3. of this manual.

#### 4.3. Trouble shooting

1. No picture on the screen:  
Check the cable connections and switch settings on the RGB card referring to section 5 (especially switch 3 has to be OFF)
2. Picture is present but screen is rolling (no sync):  
This problem can occur on the NEC monitor JC-1203 DH. Check the sync switch located on the rear of the monitor and make sure that it is set to the sync negative position.
3. Picture is present but screen is rolling (no sync):  
This problem can occur on the NEC monitor JC-1402 DH. Connect pin 7 and 8 by running a wire and soldering the wire onto the two pins.
4. Picture is present, however only 8 instead of 16 colors are available:  
Please check your monitor instruction booklet if you have an 4bit RGB TTL monitor (that means RGB + intensity control), if not then only 8 colors can be seen.
5. Picture is present but text is blurred and out of focus:  
Please check the setting of the switch 8 on the RGB card. This switch should be in the open position.
6. Intensity of the lettering is not stable (flickering):  
Please check the setting of switch 4 on the RGB card, this switch should be in the open position.
7. Flickering and waving motion on the screen:  
Sometimes after frequent and long duration of use of the monitor with the color card waving motion on the screen may affect you. This is no fault of the card, however we suggest the using of dark background colors with light text colors. This should eliminate this effect.  
VIDEX CARD USERS PLEASE READ:
8. Too much power consumption on former APPLE II models (not IIe):  
Sometimes when a large number of cards are present on the APPLE motherboard the power consumption is strained so that not enough current is available to properly run the RGB card. If you are sure that your card is installed properly and all settings are correct then it is possible that the above problem may exist. However this can be overcome by changing the 4 RAM chips located on the VIDEX 80col card and replacing them with NEC ICs type 444.
9. No 80col text on the screen:  
Sometimes when 80col text does not appear on the screen a hardware modification must be made to the VIDEX card. You should not attempt this but take this to the dealer for his modification. A potentiometer must be installed on the VIDEX card as indicated on the figure:



schwarz gekennzeichnete  
Teile einfügen! (Trimmer 10gängig)  
black marked parts to be inserted!  
(pots 10turn)

VIDEX

## 5. Operating instructions

On the RGB interface card you have the option to use the build in functions via hardware by the setting of the 8 DIP-switches or via software by POKE commands. Please remember: If you choose to make hardware switch settings different from the recommended setting of the switches in the instruction manual then software modifications will not be possible.

### 5.1. Hardwareswitches

Switch 1 (please note that the switches on the RGB card are numbered from the left to the right 1/8):

- "OFF": 150 Ohm resistor cut off
- "ON": 150 Ohm resistor connected

#### Explanation:

This switch cuts off an 150 Ohm resistor from the 80col video input so that only a parallel 1 kOhm resistor is connected to the video signal. By that you can change the signal amplitude and second when you connect directly via a T-connector a monitor to the card which is terminated by 75 Ohms by a second termination of 75 Ohms the signal would be damped too much and therefore the card be overloaded.

#### Switch 2:

- "OFF": No picture possible
- "ON": Picture present

This switch should always be in the closed/on position, else you cannot see any picture.

#### Switch 3:

- "OFF": GR, HGR, 40col and 80col mode possible
- "ON": Only 80col mode possible

#### Switch 4:

- "OFF": No signal attenuation
- "ON": Signal attenuation of the signals from the mainboard

Switches 5 through 8 have functions that can either be set by changing their position or through POKE commands.

#### Switch 5:

- "OFF": Color register cut off
- "ON": Color register adressable

#### Switch 6:

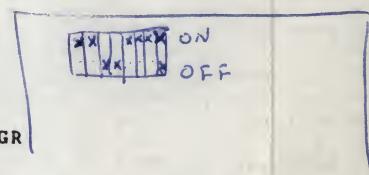
- "OFF": Only 40col mode possible
- "ON": 40 and 80col mode possible

#### Switch 7:

- "OFF": Monochrome
- "ON": Color

#### Switch 8:

- "OFF": Standard mode in text, GR and HGR
- "ON": Double density HGR



Standard setting of the DIP switches:

1 ON, 2 ON, 3 OFF, 4 OFF, 5 ON, 6 ON, 7 ON, 8 OFF

### 5.2. Softwareswitches

For your first tries with the software switches it is recommended to set all the hardwareswitches 5 to 8 to the ON position. By doing this you can use all the build-in software switches. When you become familiar with the functions you can use the soft and hardwareswitches as needed but please remember as stated before

HARDWARESWITCHES OVERRIDE SOFTWARESWITCHES.

In order to use the software settings the hardwareswitches on the RGB card (5 through 8) must be in the ON position.

Switch 5: POKE 49407, xx (COFF): Color register locked. Any try to change the color register is impossible unless you unlock this by POKE command 49406, xx.  
 POKE 49406, xx (COFE): Color register is addressable. the locking via 49407, xx of the color register is ended.  
 Switch 6: POKE 49405, xx (COFD): 40col active, prevents using of PR#3 Both, 40col and 80col screens are possible. The 80col card has to be in slot 3.  
 POKE 49404, xx (COFC):  
 Switch 7: POKE 49403, xx (COFB): Monochrome. Graphic(GR and HGR) will be shown with the colors of the color register in monochrome, especially for using text and/or graphic on the HGR pages.  
 POKE 49402, xx (COFA): The standard colors will be shown.  
 Switch 8: POKE 49401, xx (COF9): Standard mode in text, GR and HGR Double-density HGR. Double density HGR graphics show you high intensity colors on the screen but any text shown is not sharp.  
 POKE 49400, xx (COF8):

### 5.3. Color selection

print color !	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15		
POKE 49392, X !	w	a	m	m	p	g	p	d	y	l	g	d	l	b	m	b		
-----	h	q	e	e	u	r	u	k	e	i	r	k	i	r	a	1		
background-	!	i	u	d	d	r	e	r	b	1	g	e	g	r	o	g		
color	!	t	a	b	b	p	y	p	l	1	r	y	r	e	w	e		
!	e	1	1	1	1	l	u	o	e	e	d	n	n	n	c	k		
!	u	u	u	e	e	w	e	e	e	e	d	n	t	t	a	-		
-----	0 black	!	0	16	32	48	64	80	96	112	128	144	160	176	192	208	224	
1 magenta	!	1	17	33	49	65	81	97	113	129	145	161	177	193	209	242	-	
2 brown	!	2	18	34	50	66	82	98	114	130	146	162	178	194	226	243	-	
3 lightred	!	3	19	35	50	67	83	99	115	131	147	163	179	211	227	243	-	
4 darkgreen	!	4	20	36	51	68	84	100	116	132	148	164	196	212	228	244	-	
5 grey <i>dark</i>	!	5	21	37	52	69	85	101	117	133	149	181	197	213	229	245	-	
6 lightgreen!	!	6	22	38	53	70	86	102	118	134	166	182	198	214	230	246	-	
7 yellow	!	7	23	39	54	71	87	103	119	151	167	183	199	215	231	247	-	
8 darkblue	!	8	24	40	55	72	88	104	136	152	168	184	200	216	232	248	-	
9 purple	!	9	25	41	56	73	89	121	137	153	169	185	201	217	233	249	-	
10 grey <i>dark</i>	!	10	26	42	57	74	91	106	122	138	154	170	186	202	218	234	250	-
11 purple	!	11	27	43	58	91	107	123	139	155	171	187	203	219	235	251	-	
12 medblue	!	12	28	44	76	92	108	124	140	156	172	188	204	220	236	252	-	
13 medblue <i>light</i>	!	13	29	60	77	93	109	125	141	157	173	189	205	221	237	253	-	
14 aqua	!	14	46	60	78	94	110	126	142	158	174	190	206	222	238	254	-	
15 white	!	31	47	61	79	95	111	127	143	159	175	191	207	223	239	255	-	

## 6. Color demonstration program

```
1 I = 0
10 HOME
15 IF I>255 THEN GOTO 1
16 FOR I= I TO 255
17 VTAB 12: HTAB 30: CALL -868
18 VTAB 10: HTAB 30: CALL -868
20 POKE 49392,I
21 K% = I/16
22 L=I/16
23 M=L-K%
24 M=M*16
25 REM IF 15-M=K% THEN NEXT I:GOTO 32
26 VTAB 5:HTAB 9: PRINT "RGB-COLORCARD AI-80Z"
27 VTAB 12:HTAB 10: PRINT "BACKGROUND COLOR =";M
28 VTAB 13:HTAB 10: PRINT "TEXT COLOR ... =";K%
29 VTAB 15:HTAB 10: PRINT "CONT. OF ADR. POKE 49392, ";I
30 VTAB 22: PRINT "<ESC>=END <RETURN>=PAUSE <->=1STEP BACK"
31 FOR A=1 TO 500:NEXT A
32 IF PEEK (-16384)>127 THEN GET A$:IF A$=CHR$(27) THEN HOME:END
33 IF A$=CHR$(45) THEN I=I-2: IF I<0 THEN I=0
34 IF A$=CHR$(45) THEN A$="" :NEXT I:GOT016
35 IF LEN(A$)>0 THEN GET B$
36 POKE -16368,0:A$ =""
37 IF B$=CHR$(27) THEN HOME:END
38 NEXT I
39 VTAB 15:HTAB 35:CALL -868
40 GOTO 15
```

## 7. Warranty and copyright

The manufacturer guarantees a faultfree operation of this product. When this product does not function properly only authorized sales representatives should be consulted.

Neither the manufacturer nor the distributor or the dealer are responsible for any damages incurred to any other products used in association with this product.

Any changes or modifications to this product by not authorized persons automatically void the warranty.

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